

**ATTACHMENT B**  
**STANDARD PROVISIONS**  
**FOR**  
**NATIONAL POLLUTANT DISCHARGE**  
**ELIMINATION SYSTEM (NPDES) PERMITS**

1. The permittee must comply with all of the terms, requirements, and conditions of this NPDES Permit. Any violation of this Permit constitutes violation of the Clean Water Act (CWA), its regulations and the California Water Code, and is grounds for enforcement action, permit termination, permit revocation, and reissuance, denial of an application for permit reissuance; or a combination thereof.
2. The permittee shall comply with effluent standards or prohibitions established under 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this Permit has not yet been modified to incorporate the requirement. [40 CFR 122.41(a)(1)]

The California Water Code provides that any person who violates a Waste Discharge Requirement (same as permit condition), or a provision of the California Water Code, is subject to civil penalties of up to \$1,000 per day or \$10,000 per day of violation, or when the violation involves the discharge of pollutants, is subject to civil penalties of up to \$10 per gallon per day or \$20 per gallon per day of violation; or some combination thereof, depending on the violation, or upon the combination of violations.\*

Violations of any of the provisions of the NPDES program, or of any of the provisions of this Permit, may subject the violator to any of the penalties described herein, or any combination thereof, at the discretion of the prosecuting authority; except that only one kind of penalty may be applied for each kind of violation.\*

3. The CWA provides that any person who violates a Permit condition implementing Sections 301, 302, 306, 307, or 308 of the CWA is subject to a civil penalty not to exceed \$10,000 per day of such violation. Any person who willfully or negligently violates Permit conditions implementing these Sections of the CWA is subject to a fine of not less than \$2,500, nor more than \$25,000 per day of violation, or by imprisonment for not more than one year, or both. [40 CFR 122.41(a)(2)]
4. If the permittee wishes to continue an activity regulated by this Permit after the expiration date of this Permit, the permittee must apply for and obtain a new Permit. [40 CFR 122.41(b)]
5. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit. [40 CFR 122.41(c)]
6. The permittee shall take all reasonable steps to minimize or prevent any discharge that has a reasonable likelihood of adversely affecting health or the environment. [40 CFR 122.41(d)]
7. The permittee shall, at all times, properly operate and maintain all the facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with this Permit.

Proper operation and maintenance includes adequate laboratory controls, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities, or similar systems that are installed by a permittee only when necessary to achieve compliance with the conditions of this Permit. [40 CFR 122.41(e)]

8. This Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a Permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. [40 CFR 122.41(g)]
9. This Permit does not convey any property rights of any sort, or any exclusive privilege. [40 CFR 122.41(f)]
10. The permittee shall furnish, within a reasonable time, any information the Regional Board or EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit. The permittee shall also furnish to the Regional Board, upon request, copies of records required to be kept by this Permit. [40 CFR 122.41(h)]
11. The Regional Board, EPA, and other authorized representatives shall be allowed:
  - (a) Entry upon premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Permit;
  - (b) Access to copy any records that are kept under the conditions of this Permit;
  - (c) To inspect any facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and
  - (d) To photograph, sample, and monitor for the purpose of assuring compliance with this Permit, or as otherwise authorized by the CWA. [40 CFR 122.41(I)]
12. Monitoring and records.
  - (a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
  - (b) The permittee shall retain records of all monitoring information, including all calibration and maintenance monitoring instrumentation, copies of all reports required by this Permit, and records of all data used to complete the application for this Permit, for a period of at least three years from the date of the sample, measurement, report, or application. This period may be extended by request of the Regional Board or EPA at any time.
  - (c) Records of monitoring information shall include:
    - (i) The date, exact place, and time of sampling or measurements;
    - (ii) The individual(s) who performed the sampling or measurements;
    - (iii) The date(s) analyses were performed;
    - (iv) The individual(s) who performed the analyses;
    - (v) The analytical techniques or methods used; and
    - (vi) The results of such analyses.
  - (d) Monitoring must be conducted according to test procedures under 40 CFR Part 136, unless other test procedures have been specified in this Permit.

- (e) The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device, or method required to be maintained under this Permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

[40 CFR 122.41(j)]

- 13. All applications, reports, or information submitted to the Regional Board shall be signed and certified in accordance with 40 CFR 122.22 [40 CFR 122.41(k)(1)]
- 14. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both. [40 CFR 122.41(k)(2)]
- 15. Reporting requirements:
  - (a) The permittee shall give advance notice to the Regional Board, as soon as possible of, any planned physical alterations, or additions to the permitted facility.
  - (b) The permittee shall give advance notice to the Regional Board of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.
  - (c) This Permit is not transferable to any person, except after notice to the Regional Board. The Regional Board may require modification, or revocation and reissuance of the Permit to change the name of the permittee, and incorporate such other requirements as may be necessary under the CWA.
  - (d) Monitoring results shall be reported at the intervals specified elsewhere in this Permit.
    - (i) Monitoring results must be reported in a Discharge Monitoring Report (DMR).
    - (ii) If the permittee monitors any pollutant more frequently than required by this Permit using test procedures approved under 40 CFR Part 136 or as specified in this Permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.
    - (iii) Calculations for all limitations that require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this Permit.
  - (e) Report of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this Permit shall be submitted no later than 14 days following each schedule date.
  - (f) Twenty-four hour reporting.
    - (i) The permittee shall report any noncompliance that may endanger health or the environment to the Regional Board. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee



becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and time and, if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

- (ii) The following shall be included as information that must be report within 24 hours under this paragraph;
  - (A) Any unanticipated bypass that exceeds any effluent limitation in the Permit.
  - (B) Any upset that exceeds any effluent limitation in the Permit.
  - (C) Violation of a maximum daily discharge limitation for any of the pollutants listed in this Permit to be reported within 24 hours.
- (iii) The Regional Board may waive the above-required written report on a case-by-case basis.
- (g) The permittee shall report all instances of noncompliance, not otherwise reported under the above paragraphs, at the time monitoring reports are submitted. The reports shall contain all information listed in paragraph 15(f) above.[40 CFR 122.41(1)]

16. Bypass (the intentional diversion of waste streams from any portion of facility) is prohibited. The Board may take enforcement action against the permittee for bypass unless:

- (a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage. (Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.);
- (b) There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that could occur during normal periods of equipment downtime or preventive maintenance; and
- (c) The permittee submitted a notice, at least ten days in advance, of the need for a bypass to the appropriate Board.

The permittee may allow a bypass to occur that does not cause effluent limitations to be exceeded, but only if it is for essential maintenance to assure efficient operation. In such a case, the above bypass conditions are not applicable.

The permittee shall submit notice of an unanticipated bypass as required in paragraph 15(f) above.  
[40 CFR 122.41(m)]

17. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or

careless or improper action. A permittee that wishes to establish the affirmative defense of an upset in an action brought for noncompliance shall demonstrate, through signed, contemporaneous operating logs, or other relevant evidence that:

- (a) an upset occurred and that the permittee can identify the cause(s) of the upset;
- (b) the permitted facility was being properly operated at the time of the upset;
- (c) the permittee submitted notice of the upset as required in paragraph 15(f) above; and
- (d) the permittee complied with any remedial measures required under paragraph 7.

No determination made before an action for noncompliance, such as during administrative review of claims that noncompliance was caused by an upset; is final administrative action subject to judicial review.

In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof. [40 CFR 122.41(n)]

18. All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Regional Board as soon as they know or have reason to believe:
- (a) that any activity has occurred or will occur that would result in the discharge of any toxic pollutant that is not limited in this Permit, if that discharge will exceed the highest of the following "notification levels:"
    - (i) One hundred micrograms per liter (100 µg/L);
    - (ii) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and 2-methyl-4-b-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
    - (iii) Five (5) times the maximum concentration value reported for that pollutant in the Permit application; or
    - (iv) The level established by the Regional Board in accordance with 40 CFR 122.44(f).
  - (b) that they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant that was not reported in the Permit application.  
[40 CFR 122.42(a)]

\* This paragraph was added or modified by the State Water Quality Control Board to the California Water Code.

## APPENDIX C

### CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD LAHONTAN REGION

MONITORING AND REPORTING PROGRAM NO. R6T-2010-0015  
WDID NO. 6A020405008  
NPDES NO. CA0103209

FOR

### CALIFORNIA DEPARTMENT OF FISH AND GAME PAIUTE CUTTHROAT TROUT RESTORATION PROJECT

ALPINE COUNTY

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#### I. MONITORING PROGRAM GOALS

- A. To ensure compliance with receiving water limits established in Water Board Order R6T-2010-0015
- B. To establish the nature and duration of rotenone treatment impacts to benthic macroinvertebrate populations, and verify that those populations and beneficial uses have been restored following treatment.
- C. To detect, capture, and relocate out of the project area any threatened, endangered, sensitive, candidate or rare amphibians prior to rotenone treatment.

#### II. DETERMINATION OF PROJECT BOUNDARIES

The project boundaries for rotenone projects are defined, pursuant to the Basin Plan, as encompassing the treatment area, the detoxification area, and the area downstream of the detoxification station up to a thirty-minute in-stream travel time.

The California Department of Fish and Game (DFG, the Discharger) shall estimate the distance from the detoxification station to the downstream thirty-minute travel time endpoint, based on measurements of stream flow and/or average velocities, prior to commencement of rotenone application. This endpoint will define the downstream extremity of the project boundaries. The location of the project boundaries shall be identified one-to two-weeks before project implementation and recorded, along with any calculations used in making the determination.

### III. SURFACE WATER MONITORING

#### A. Temperature

The Discharger shall measure and record water temperature whenever samples are collected for chemical analysis (according to the schedule described below), at the corresponding monitoring station and at the same time as sample collection.

#### B. Color

The Discharger shall visually inspect the stream water downstream of project boundaries at least three times a day during daylight operations, to ascertain whether discoloration due to potassium permanganate is discernible more than two miles downstream of project boundaries, and shall keep records of the observations.

#### C. Sample Location

Samples will be collected at the following locations, depicted in Attachment 1:

<u>Station Code</u>	<u>Location Description</u>
MSKC1	Silver King Creek, at project boundaries
MSKC2	Silver King Creek, immediately upstream of detoxification station
MSKC3	Silver King Creek, Lower Fish Valley
MSKC5	Silver King Creek, Long Valley
MSKC7	Silver King Creek Canyon
MTC1	Tamarack Creek, trail crossing
MTC2	Tamarack Creek
MTLC	Tamarack Lake Creek

All locations will be flagged and GPS locations will be determined and provided to the Water Board at least 24-hours prior to project implementation. Sample sites may need to be added or subtracted depending upon stream flow conditions and logistics on a given year. Changes in sampling protocol will be mutually agreed upon between the Discharger and the Water Board in advance of sample collection.



#### D. Sampling Methods, Analyses and Analytical Methods

Sampling protocols shall conform to the July 2, 2004 Monitoring Plan submitted by the Discharger, and incorporated herein by reference. Samples collected by the Discharger will be analyzed at the Department of Fish and Game laboratory certified by the California Department of Health Services. Water Board staff may independently sample and have samples analyzed at a separate laboratory for quality control. Constituents shall be sampled and results reported according to the following table:

Constituent	Analytical Methods	Units	Sample Type
Rotenone	McMillin and Finlayson, 2008 <sup>1</sup>	µg/L	Grab
Rotenolone	McMillin and Finlayson, 2008 <sup>1</sup>	µg/L	Grab
Volatile Organic Compounds (VOCs)	USEPA 8260	µg/L	Grab
Semi-Volatile Organic Compounds (SVOCs)	USEPA 8270	µg/L	Grab
Di(ethylene glycol) ethyl ether (DEE)	McMillin and Finlayson, 2008 <sup>1</sup>	µg/L	Grab
1-methyl1-2-pyrrolidone (MP)	McMillin and Finlayson, 2008 <sup>1</sup>	µg/L	Grab

<sup>1</sup> McMillin, S. and B.J. Finlayson. 2008. *Chemical residues in water and sediment following rotenone application to Lake Davis, California 2007, Appendix A: Water Pollution Control Laboratory Analytical Methods*. California Department of Fish and Game, Pesticide Investigations Unit, OSPR Administrative Report 08-01, Rancho Cordova, California.

#### E. Sampling Schedule

Samples shall be collected for analysis according to the schedule indicated in the following table. Pre-treatment samples shall be collected not more than 24 hours prior to application of rotenone. Sample timing may need to be changed depending upon stream flow conditions and logistics on a given year. Changes in sampling protocol will be mutually agreed upon between the Discharger and the Water Board in advance of sample collection.

Analysis	Site	Pre-Treatment	During Treatment	Day After Treatment	Weekly Post-Treatment
Rotenone & Rotenolone	MSKC1	X	every 2 hrs	X	X <sup>2</sup>
"	MSKC2	X	every 2 hrs	X	X <sup>2</sup>
"	MSKC3		Twice	X	X <sup>2</sup>
"	MSKC5		Twice	X	X <sup>2</sup>
"	MSKC7		Twice	X	X <sup>2</sup>
"	MTLC1		Twice	X	X <sup>2</sup>
"	MTC1		Twice	X	X <sup>2</sup>
"	MTC2		Twice	X	X <sup>2</sup>
VOC/SVOC	MSKC1	X	Twice		X <sup>2</sup>
"	MSKC2	X	Twice		
DEE/MP	MSCK1	X	Twice	X	X <sup>2</sup>
"	MTC1	X	Twice		
"	MTC2	X	Twice		

<sup>2</sup> If any chemical treatment residues are detected on the day after treatment at any sampling station, weekly samples shall be collected and analyzed at that station and any downstream station(s), until no residues are detected. Samples collected and analyzed pre-treatment and during treatment are done for operational purposes.

The Discharger shall take up to three additional samples within the treatment area the day after treatment as directed by Water Board staff, in collaboration with Department of Fish and Game personnel, where water is ponded, stagnant or slow moving. These locations will be identified using GPS equipment and shall be documented in monitoring reports that are available to the public.

#### F. Toxicity

Caged fish shall be used to determine whether detoxification is effective and ascertain whether rotenone toxicity has escaped beyond project boundaries. Prior to the discharge of rotenone formulation, caged fish shall be positioned just above the neutralization station, midway at the 15-minute stream travel time location, and at the project boundary 30 minutes travel time downstream of the detoxification station. The caged fish shall be maintained and observed for stress at least twice per day during treatment and detoxification operations, and observations shall be recorded. Stressed or dead caged fish will be replaced in accordance with the Discharger's Neutralization Implementation Plan. Use of caged fish shall cease two days after cessation of rotenone application.

#### G. Benthic Macroinvertebrate Monitoring

The Discharger shall conduct aquatic macroinvertebrate monitoring according to the Silver King Creek Macroinvertebrate Monitoring, August 2007-2015 study plan submitted by the Discharger, and incorporated herein as Attachment 2, which is made a part of this Monitoring and Reporting Program.

#### H. Amphibian Surveys

The Discharger shall conduct amphibian surveys immediately prior to treatment, according to protocols described in Attachment 4.

#### I. Identification and Protection of Sensitive Macroinvertebrate Refugia Habitats

The Discharger shall use aerial photography, previous fishery and amphibian surveys, and field surveys to identify potential areas for sensitive macroinvertebrates. These waters shall be sampled or verified for the presence of non-native fish. Project team leaders shall reach consensus that the habitat or reach is fishless and will chemically treat only those sites that could not been verified as fishless, so as to not put the success of restoration project at risk for failure. After a decision is made, the water or habitat will be flagged and GPS waypoints logged for incorporation on project area maps as "no treatment areas."

Annual inspections of no-treatment sensitive benthic macroinvertebrate refugia habitats will be performed to verify the absence of fish. Should annual inspections prior to subsequent treatments indicate that fish have colonized one or more of the habitats the no-treatment status of that specific habitat would be removed.

Project implementation teams will be provided treatment area maps with the non-treatment areas clearly identified and GPS waypoints would be loaded on each team member's portable GPS unit. Prior to treatment individual team leaders would be oriented to each non-treatment habitat to ensure that every applicator has knowledge of the non-treatment status.

The Discharger shall conduct these surveys of springs, seeps, and headwaters in the project area no more than two weeks prior to treatment to determine whether or not they are fishless (where insufficient habitat or water volume exists at time of treatment to contain a fish). The Discharger shall communicate these locations to applicators and to Water Board staff through flagging, mapping, and GPS

coordinates, as described above. The Discharger shall submit this information to the Water Board at least one day prior to treatment. **By November 1** of each year of any chemical treatment, the Discharger shall submit a final map certifying areas within project boundaries that received no rotenone application.

## II. REPORTING

- A. One day before treatment, the Discharger shall submit a draft map of treatment and "no treatment" areas. By November 1 of each year of any chemical treatment, the Discharger shall submit a final map certifying areas within project boundaries that received no rotenone application.
- B. No later than 60 days of completion of each season's treatment, the Discharger shall submit a monitoring report to the Water Board within The report shall include the following:
  - 1. Data required by this monitoring and reporting program;
  - 2. Approximate volumetric flow rate of each creek discharged to on application day;
  - 3. Volume of rotenone product used, by location applied;
  - 4. Amount of potassium permanganate used;
  - 5. Summary of project; and
  - 6. Evaluation of project success (eradication of non-native fish species after the third year of the project).

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with this Order.

- B. The monitoring report shall include a cover letter containing the information and certification in the Monitoring and Reporting Cover Letter form (Attachment 3), which is hereby made a part of this Monitoring and Reporting Program.
- C. The Discharger shall clearly identify in the monitoring report any violations of Board Order R6T-2010-(PROP), and submit a statement of corrective actions taken or proposed, including a timetable for implementation.
- D. The Discharger shall submit a report to comply with condition 3 of Basin Plan Section 4.9, which states: "Within two years of the last treatment for a specific project, a fisheries biologist or related specialist from the DFG must assess the restoration of applicable beneficial uses to the

treated waters, and certify in writing that those beneficial uses have been restored. A project will be considered to have been completed upon written acceptance by the Regional Board's Executive Officer of such certification."

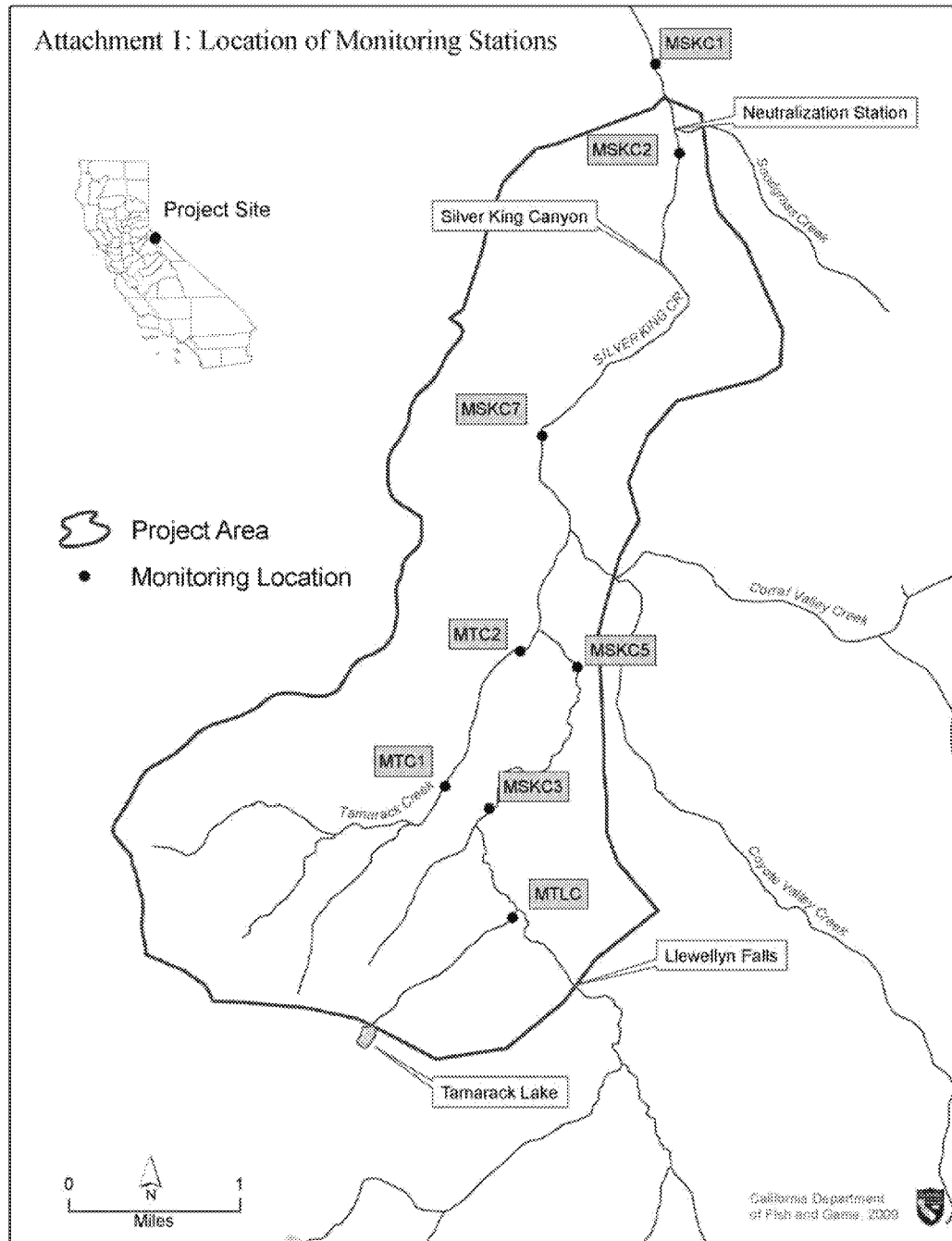
- III. The Discharger shall implement the above monitoring program immediately upon the commencement of the initial discharge covered by the Order. This Monitoring and Reporting Program may be modified by the Executive Officer.

Ordered by:   
HAROLD J. SINGER  
EXECUTIVE OFFICER

Dated: April 14, 2010

- Attachments:
1. Map - Location of Monitoring Stations
  2. Silver King Creek Macroinvertebrate Monitoring, August 2007-2015
  3. Monitoring Report Cover Letter form
  4. 2007 Sierra Nevada Fish and Amphibian Inventory Data Sheet Instructions

# Attachment I: Location of Monitoring Stations





## **Silver King Creek Macroinvertebrate Monitoring August 2007-2015**

### **Background**

The California Department of Fish and Game and the U.S. Fish and Wildlife Service propose to treat Silver King Creek basin with rotenone during the late summer of 2009, 2010, and possibly 2011. The goal of this project is to restore Paiute cutthroat trout (*Oncorhynchus clarkii seleniris*), a federally listed threatened species, to its historic habitat.

While rotenone is intended to eradicate non-native trout, it is also toxic to some aquatic macroinvertebrates. Rotenone was first used in the Silver King Creek basin in 1964, and on various occasions and locations up to 1993. Macroinvertebrate sampling within the basin began in 1984 and has occurred periodically up to 2007.

This monitoring study differs from the June 15, 2003, Interagency Study Proposal in that it incorporates more sampling stations throughout the basin as well as additional “control” and “treatment” sites. The sampling methodology is also changed to allow for additional analyses such as the River Invertebrate Prediction and Classification System (RIVPACS) analysis model (Hawkins et al. 2000).

### **Objectives**

The primary objectives of this study are to: 1) analyze changes in macroinvertebrate assemblages and taxa from the use of rotenone during Paiute cutthroat trout recovery activities, 2) collect and identify taxa from the Silver King Creek basin, and 3) reestablish historic collection sites in selected streams.

### **Study Design**

Twenty-three quantitative and 5 qualitative sampling site locations were established during August 2007 (Table 1). This study design differs from the June 15, 2003, Interagency Study Proposal in that it incorporates more sampling stations throughout the basin as well as additional “control” and “treatment” sites (nine pairs) (Figures 1 and 2). Five qualitative sampling sites were established within the area to be treated to increase the likelihood of collecting taxa with low relative abundances, i.e. rare taxa (Figure 3). The sampling methodology is also changed to allow for additional analyses.

Past analyses to evaluate the effects of rotenone on aquatic biota are hampered by the lack of data on aquatic invertebrate assemblages prior to the use of rotenone (Vinson and Vinson 2007). This monitoring effort includes five quantitative sampling sites (SKC Site 1 & 2, Tamarack Sites 1-3) and 3 qualitative sampling sites (SKC Site 1, Tamarack Sites

1 & 2) in areas that have never been treated with rotenone which are expected to be treated in the future.

Pre-treatment sampling will be conducted at all sites during mid-August 2007, and 2008. Further pre-treatment sampling will also be conducted at all sites during mid-August 2009, immediately prior to treatment. Post-treatment monitoring will be conducted during mid-August the first year after treatment, 3 years post-treatment, and 5 years post-treatment.

Table 1. Sample type and locations within the Silver King Creek basin.

<b>Stream</b>	<b>Site Number</b>	<b>Sample Type</b>	<b>Site Type</b>	<b>UTM North</b>	<b>UTM East</b>	<b>Elev. (m)</b>
Bull Creek	Bull Site 1	Quantitative		4259066	273218	2457
Corral Creek	Corral Site 1	Quantitative		4263805	274123	2424
Corral Creek	Corral Site 2	Quantitative		4263251	275248	2510
Coyote Creek	Coyote Site 1	Quantitative	Control	4262687	273342	2411
Coyote Creek	Coyote Site 2	Quantitative	Control	4261839	273608	2481
Coyote Creek	Coyote Site 3	Quantitative	Control	4260799	274522	2492
Fly Valley Creek	Fly Site 1	Quantitative		4256568	272140	2653
Four Mile Creek	Four Mile Site 1	Quantitative		4257098	274165	2560
Silver King Creek	SKC Site 1	Quantitative	Treatment	4264901	272645	2333
Silver King Creek	SKC Site 2	Quantitative	Treatment	4263842	272756	2345
Silver King Creek	SKC Site 3	Quantitative	Treatment	4262456	272874	2376
Silver King Creek	SKC Site 4	Quantitative	Treatment	4262005	272675	2383
Silver King Creek	SKC Site 5	Quantitative	Treatment	4260832	272085	2416
Silver King Creek	SKC Site 6	Quantitative	Treatment	4260099	272602	2426
Silver King Creek	SKC Site 7	Quantitative	Control	4259608	273247	2456
Silver King Creek	SKC Site 8	Quantitative	Control	4259289	273140	2460
Silver King Creek	SKC Site 9	Quantitative	Control	4258963	273359	2462
Silver King Creek	SKC Site 10	Quantitative	Control	4258354	273562	2473
Silver King Creek	SKC Site 11	Quantitative	Control	4257651	273471	2503
Silver King Creek	SKC Site 12	Quantitative	Control	4257022	273187	2506
Tamarack Creek	Tamarack Site 2	Quantitative	Treatment	4261479	271383	2422
Tamarack Creek	Tamarack Site 1	Quantitative	Treatment	4262448	271943	2400
Tamarack Creek	Tamarack Site 3	Quantitative	Treatment	4261437	270915	2443
Silver King Creek	SKC Site 1	Qualitative		4264901	272645	2333
Silver King Creek	SKC Site 2	Qualitative		4260655	272242	2416
Silver King Creek	SKC Site 3	Qualitative		4259883	272755	2425
Tamarack Creek	Tamarack Site 1	Qualitative		4261873	271653	2411
Tamarack Creek	Tamarack Site 2	Qualitative		4261457	270972	2439

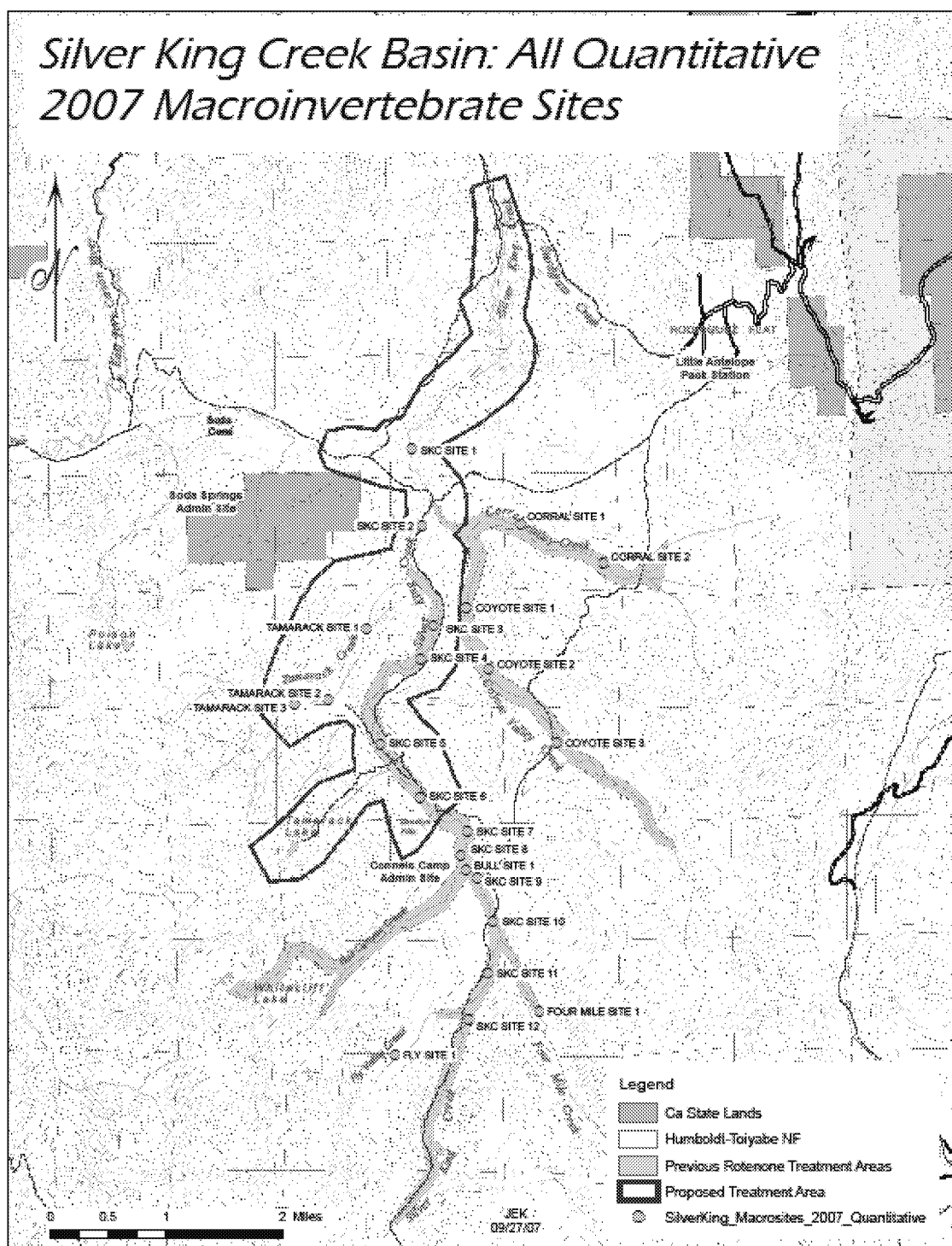


Figure 1. Quantitative sampling sites within the Silver King Creek basin.

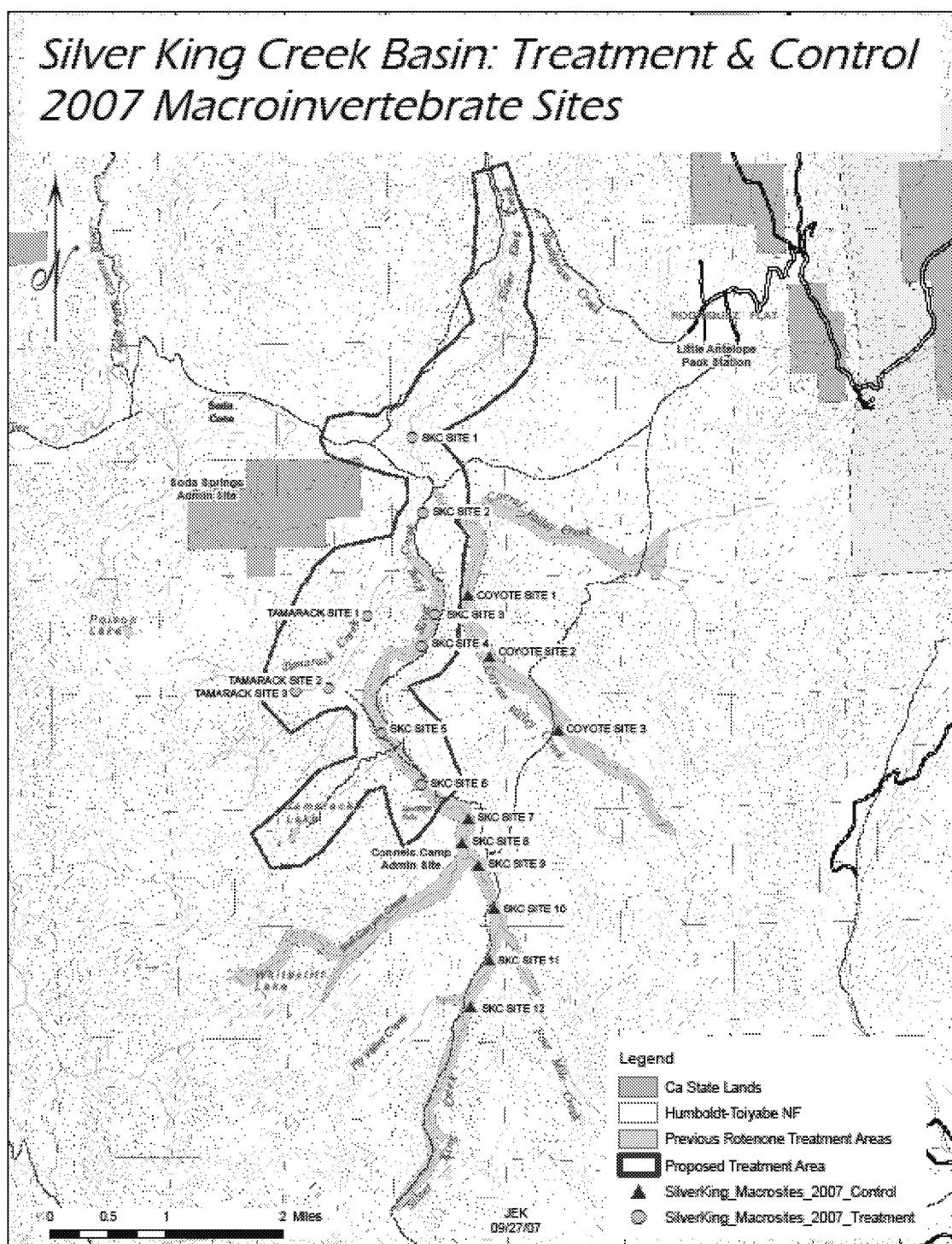


Figure 2. Quantitative sampling “control” and “treatment” sites within the Silver King Creek basin.

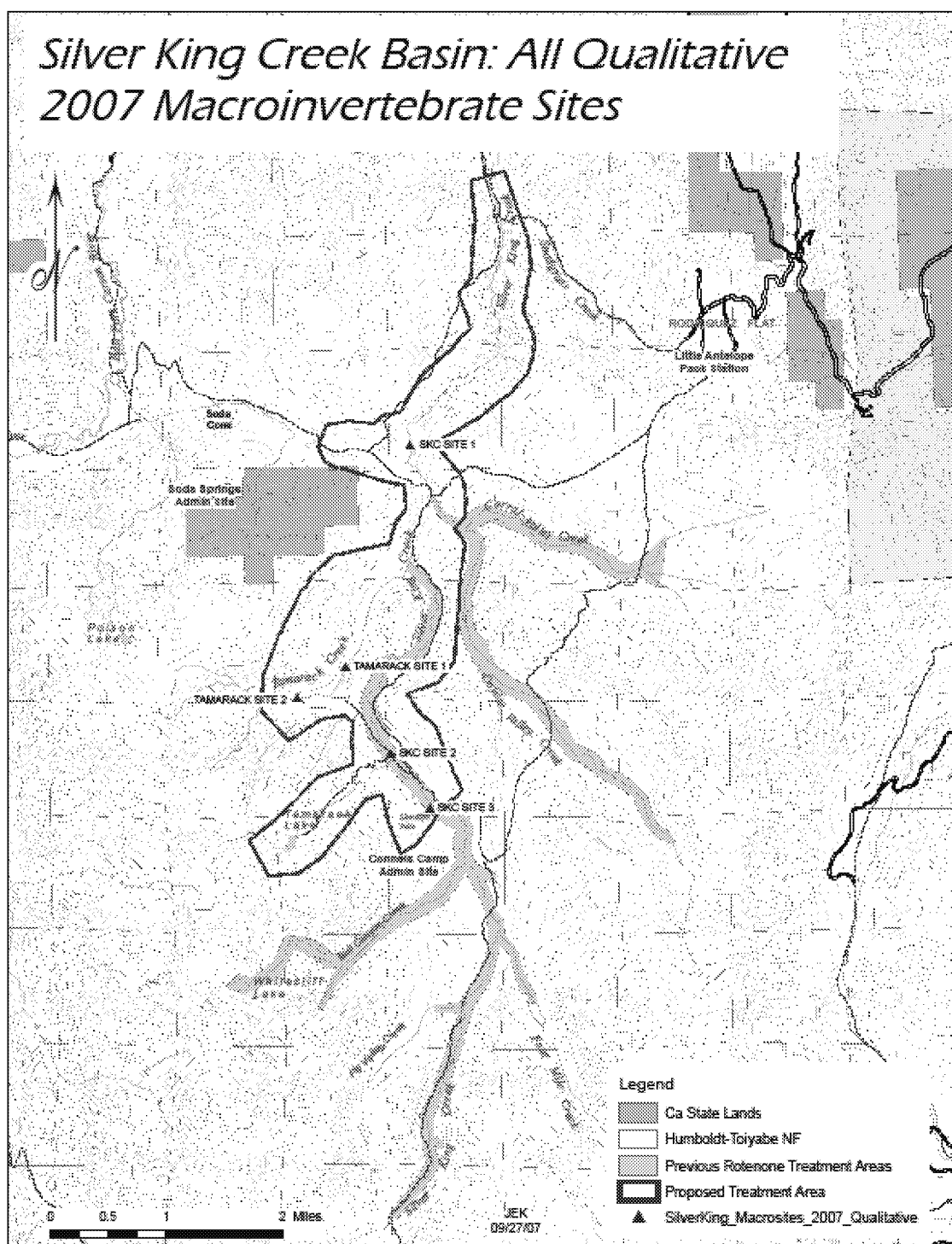


Figure 3. Qualitative sampling sites within the Silver King Creek basin.

## Sampling Methods

Stream Invertebrate Collection Procedures as described by the National Aquatic Monitoring Center at Utah State University, Logan, Utah ([www.usu.edu/buglab/](http://www.usu.edu/buglab/)) will be followed. Samples will be sent to the National Aquatic Monitoring Center at Utah State University, Logan, Utah for processing (see [www.usu.edu/buglab/](http://www.usu.edu/buglab/) for laboratory methods). Table 2 provides the normal taxonomic resolution of processed samples.

### *Fixed Area Quantitative Samples*

The objective of quantitative invertebrate sampling is to collect the more common invertebrates at a site and estimate their relative abundances. Quantitative samples are collected using a Surber net (0.09 m<sup>2</sup>) with a 500 micron mesh net. Eight samples are collected in 4 different riffles (2 samples from each riffle) and composited to make a single sample of approximately 0.74 m<sup>2</sup> for each location on each sampling date.

### *Qualitative Invertebrate Collections*

The objective of qualitative invertebrate collections is to collect as many different kinds of invertebrates living at a site as possible. Samples are collected with a Surber net or a kicknet (457 x 229 mm) with a 500 micron mesh net and by hand picking invertebrates from woody debris and large boulders. All major habitat types (e.g., riffles, pools, back waters, macrophyte beds) are sampled and all samples are composited to form a single sample from each site.

Table 2. Normal taxonomic resolution provided by the National Aquatic Monitoring Center.

Taxon or Taxa group	BugLab's Current Standard Taxonomic Level	Northwest Bioassessment Work Group Minimum Standard Taxonomic Effort
Annelida		
Hirudinea	Genus/species	Genus
Oligochaeta	Order	Family
Arthropoda		
Hydracarina	Family/Genus/species	Order
Crustacea		
Anostraca	Genus/species	Genus/species
Cladocera	Genus/species	
Copepoda	Genus/species	
Decapoda	Genus/species	Genus
Ostracoda	Order/Family/Genus	



Table 2. Continued.		
Taxon or Taxa group	BugLab's Current Standard Taxonomic Level	Northwest Bioassessment Work Group Minimum Standard Taxonomic Effort
Arthropoda		
Crustacea		
Amphipoda	Genus/species	Genus
Isopoda	Genus	Genus
Collembola	Order	
Insecta		
Coleoptera	Genus/species	Genus
Except Curculionidae, Heteroceridae, Ptiliidae	Family	Family
Diptera		
Atherceridae	Genus/species	Genus
Blephariceridae	Genus/species	Genus
Ceratopogonidae	Genus	Subfamily
Chaoboridae	Genus	
Chironomidae	Subfamily	Genus
Culicidae	Genus	
Deuterophlebiidae	Genus/species	Genus
Dixidae	Genus	Genus
Dolichopodidae	Family	Family
Empididae	Genus	Genus
Ephydriidae	Family	Family
Muscidae	Family	Family
Pelecorhynchidae	Genus	Genus
Psychodidae	Genus	Genus
Ptychopteridae	Genus	Genus
Sciomyzidae	Family	
Simuliidae	Genus	Genus
Stratiomyidae	Genus	Genus
Tabanidae	Genus	Family
Tanyderidae	Genus	Genus
Thaumaleidae	Genus	Genus
Tipulidae	Genus	Genus
Ephemeroptera	Genus/species	Genus
Ephemerellidae	species	species
Hemiptera	Genus/species	Genus

Table 2. Continued.		
Taxon or Taxa group	BugLab's Current Standard Taxonomic Level	Northwest Bioassessment Work Group Minimum Standard Taxonomic Effort
Arthropoda		
Lepidoptera	Genus	Genus
Megaloptera	Genus/species	Genus
Odonata	Genus/species	Genus
Plecoptera	Genus/species	Genus
Pteronarcyidae	species	species
Taeniopterygidae	Family/Genus	Family
Trichoptera	Genus/species	
Coelenterata	Class	Class/Order
Mollusca		
Gastropoda	Family/Genus/species	Genus
Pelecypoda	Order/Family/Genus	Genus
Sphaeriidae	Genus/species	Family/Genus
Nematoda	Phylum	Phylum
Nematomphora	Phylum	Phylum
Porifera	Phylum	Phylum
Turbellaria	Class	Class

## Data summarization

As part of the National Aquatic Monitoring Center standard reporting, the following metrics or ecological summaries are provided for each sampling station:

Taxa richness, Genera richness	Abundance
EPT	Number of families
Percent taxon or family dominance	Shannon Diversity Index
Biotic indices - Hilsenhoff Biotic Index	Evenness
USFS Community tolerant quotient	Functional feeding group measures
Shredders	Scrapers
Collector-filterers	Collector-gatherers
Predators	Unknown feeding group
Clinger taxa	Long-live taxa

Additional information on the metrics and how they are calculated can be found at [www.usu.edu/buglab/](http://www.usu.edu/buglab/).

## **Statistical analyses**

An equal number (nine pairs) of control and treatment sites will be sampled before and after the treatment with rotenone. Pre-treatment sampling will occur in 2007, 2008, and 2009; post-treatment monitoring will be conducted during mid-August the first year after treatment, 3 years post-treatment, and 5 years post-treatment. This will allow for a BACI (Before-After-Control-Impact) analysis to be used to detect treatment effects to biological metrics. BACI analyses will follow 2 methodologies, designed to detect both short and long-term impacts. The first method is the standard BACI, where the time scale is constrained to the sampling period immediately before and after treatment. A 2-way ANOVA on selected metrics (e.g. abundance, tolerance values) with Time (Before/After) and Site (Control/Impact) is then performed, with rotenone effects assessed using the interaction term (Green 1979). Long-term effects will be analyzed using a BACIPS (Before-After-Control-Impact Paired Series) (Stewart-Oaten 1996). In this, an average metric value for each sampling period for Control sites and Treatment sites are determined, and the difference between the averages is the response variable analyzed statistically. The differences in pre-treatment versus post-treatments are then analyzed using a basic *t*-test. Metrics to be analyzed may also include aquatic invertebrate abundance and taxa richness (genera) which Vinson and Vinson 2007 suggest that differences would be detectable following a rotenone treatment. ANOVA may be also used to evaluate differences in aquatic invertebrate assemblage measures between pre-treatment and post-samples to detect treatment effects. Simple graphs of before and after comparisons will be used to evaluate differences in invertebrate assemblage measures and diversity indices between pre-treatment and post-treatment periods (Vinson and Dinger 2006).

RIVPAC analysis will also be conducted. This analysis allows for the prediction of what taxa should occur at a site in the absence of anthropogenic actions and factors in the probability of occurrences for all individual.

Accumulation curves will be used to provide information on the adequacy of sampling and on the relative number of taxa that may be present but are yet uncollected. These methods will be used following treatment to evaluate assemblage recovery. Rare taxa, (those whose individual abundances are less than 1% of the total sample abundance) will be identified in pre-treatment sampling and tracked post-treatment to detect treatment effects. Of particular interest will be sampling sites, Tamarack 1-3 and Silver King 1 & 2, which are areas that haven't been treated with rotenone.

## **Historic Site monitoring**

Long-term sampling sites have been reestablished on Fly Valley Creek, Four-mile Creek, Bull Canyon, and at upstream historic sites in Silver King Creek. Although this monitoring study uses a different sampling design from those used historically, sampling these sites could provide additional information on historic assemblages. The Fly Valley

and Four-mile creeks sites are in areas that were never chemically treated and will not be treated.

## References

- Green, R.H. 1979. Sampling design and statistical analysis for environmental biologists. Wiley-Interscience. New York.
- Hawkins, C.P., R.H. Norris, J.N. Hogue, and J.W. Feminella. 2000. Development and evaluation of predictive models for measuring the biological integrity of streams. *Ecological Applications* 10:1456-1477.
- Stewart-Oaten, A. 1996. Problems in the analysis of environmental monitoring data. Pages 109 – 132 In Schmitt, R.J. and C.W. Osenberg, eds. *Detecting Ecological Impacts: Concepts and applications in coastal habitats*. Academic Press. New York.
- Vinson, M.R., and E. Dinger 2006. Rotenone effects on the aquatic macroinvertebrates of the Virgin River in the vicinity of the Webb Hill Barrier near St. George, Utah, 2003-2005. Final Report for Project Number: IV.A.1. Washington County Water Conservancy District. St. George, Utah. 33 pp.
- Vinson, M.R., and D. K. Vinson. 2007. An Analysis of the Effects of Rotenone on Aquatic Invertebrate assemblages in the Silver King Creek Basin, California. Final Report prepared for U.S. Forest Service, Humboldt-Toiyabe National Forest Carson City, NV. 255 pp.

Date \_\_\_\_\_

**Attachment 3**  
**Monitoring Report Cover Letter**

California Regional Water Quality Control Board  
Lahontan Region  
2501 Lake Tahoe Boulevard  
South Lake Tahoe, CA 96150

**Facility Name:**

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**Address:**

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**Contact Person:**

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**Job Title:**

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**Phone:**

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**Email:**

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**WDR/NPDES Order Number:**

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**WDID Number:**

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**Type of Report** (circle one):

Monthly    Quarterly    Semi-Annual    Annual    Other

**Month(s)** (circle applicable month(s)\*:

JAN	FEB	MAR	APR	MAY	JUN
JUL	AUG	SEP	OCT	NOV	DEC

\*annual Reports (circle the first month of the reporting period)

**Year:**

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**Violation(s)?** (Please check one):

\_\_\_\_\_ NO                      \_\_\_\_\_ YES\*

\*If YES is marked complete a-g (Attach Additional information as necessary)

**a) Brief Description of Violation:**

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**b) Section(s) of WDRs/NPDES  
Permit Violated:**

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c) Reported Value(s) or Volume:

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d) WDRs/NPDES

Limit/Condition:

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e) Date(s) and Duration of  
Violation(s):

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f) Explanation of Cause(s):

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g) Corrective Action(s)

(Specify actions taken and a schedule  
for actions to be taken)

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I certify under penalty of law that this document and all attachments were prepared under my direction or supervision following a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my knowledge of the person(s) who manage the system, or those directly responsible for data gathering, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

If you have any questions or require additional information, please contact \_\_\_\_\_ at the number provided above.

Sincerely,

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_



## 2007 Sierra Nevada Fish and Amphibian Inventory Data Sheet Instructions Version 2.3 May-15-07

California Department of Fish & Game  
Fish/Amphibian Survey Protocols

### Overview

Fill out a separate data sheet (substitute "Palm entry" for "data sheet" as necessary) for **every** lake and pond that has a Site ID, regardless of how un-lake like the site is. If the site is dry, frozen, part of another sampled water body, or is a widening of a stream (i.e., there is a current flowing through the site), indicate why a full datasheet was not filled out on the map portion of the datasheet or the notsampled field and comment field of survey main (e.g., "pond was dry"). Some data subforms will still need to be filled out in the Palm unit (see below). If you encounter ponds not shown on the 7.5' maps, fill out a data sheet if they contain fish, amphibians, and/or fairy shrimp. Meadows, marshes, and spring seeps should always be surveyed, even if they do not have Site IDs. When you visit non-lake habitat such as marshes that contain extensive ponded water, complete a single survey for the entire area. It is critical that all relevant portions of each data sheet be filled out, and that non-relevant portions be indicated as such, not simply left blank. Remember, if the data sheet is improperly filled out, the visit was a complete waste of time and money.

When you complete surveys in habitats that do not contain ponded water (e.g., streams), record the start and end UTM coordinates in the amphibian/reptile visual survey section and complete all other pertinent sections. Many stream sections that will be surveyed are associated with other Site IDs (e.g., 200 m of each inlet and outlet) and the survey data should be entered on the associated Site ID's data sheet. Record all observations in ball point pen. Keep data notebooks and otoliths in separate Ziplock bags to prevent labels from being erased by leaking alcohol.

**Recording Numbers:** Use the dot-line method for recording the number of "hits" in fields that require a count (4 hits: ●●●●; 8 hits: □□; 10 hits: ⊗), instead of the more typical four vertical lines and a slash. The dot-line method is much more space-efficient and is easier to read. In addition to categorizing the substrate type at each spot, record the presence or absence of aquatic vegetation at each spot (record hits using the dot-line method).

### General Lake Description / Survey Main

**Site ID:** This is a critical number, as it will be used to link the data sheet to a particular body of water and to identify all samples. This ID is written on the 7.5' maps available for crews to take into the field. Check the Site ID carefully before recording it on the data sheet. If you encounter a lake or pond that is not shown on the 7.5' map or a marsh, meadow or spring seep that does not have a Site ID, its Site ID will be the number of the **nearest lake or pond that has a Site ID** plus a decimal place identifier (e.g., 70377.01). Additional Site ID's for nearby unnumbered lake features will be made using consecutive numbers (e.g., 70377.02, 70377.03).

**Location:** This description should always be provided, and must be detailed enough to allow someone not familiar with the area to pinpoint the lake on a topographic map. This information is particularly critical for unnamed lakes because the GPS point is the only other reference for the location of the water body. Do not leave this space blank, no matter how obvious the lake feature is. At a minimum, give the distance and the compass direction from the site to two nearby prominent named geographical features (e.g., lakes, peaks, etc.). Lake and peak names, distances, and compass directions should be taken from 7.5' maps. Palm - Use the survey main comment field to note location.

**Date:** Write as month-day-year (Aug-10-01) and always use the three letter abbreviation for month. Palm- ensure this field auto-populates correctly. If your palm's date is incorrect this field will also be incorrect. If entering data in a palm after the survey was conducted, be sure to change the value of this field to the appropriate survey date BEFORE opening any subforms.

**Lake name:** Lake names generally originate from the 7.5' topo map. However, CDFG has also implemented its own naming system for the stocking program. Field crews should have a pre-generated field lake checklist with the proper CDFG lake name and corresponding Site ID. Use this list to populate the Lake name field.

Palm - Lake names should be auto-populated based upon the names from the high\_mountain\_lakes.shp in the GIS data framework. These names are not always correct. If the correct name is known, or the name was not auto-populated, replace the auto-populated contents with the correct name as appropriate.

Note – consecutively numbered lakes (i.e. Big Pine Lake 1, Big Pine Lake 2, etc.) are numbered starting from lowest elevation and ending at the highest elevation lake.

**Water type:** Circle the appropriate descriptor for the water type you are surveying (lake, unmapped pond, stream, marsh/meadow, spring seep). Palm-depending on the watertype, certain subforms must be completed.

Lakes should always receive the full protocol and have all applicable fields filled out.

Any unmapped lotic water body that is surveyed, regardless of size, falls under the category of “unmapped pond”, circle water type = 3 (unmapped pond). Unmapped ponds should be completely surveyed as are lakes. Visual fish surveys are not acceptable if fish are present even if the site is small and unmapped.

Stream sites should have a complete VES, visual fish survey, shrimp survey, and photo, but do not require littoral and shoreline habitat surveys or inlet and outlet surveys. Palm - Remember to record the start and end GPS points of the stream reach surveyed in the amphibian header subform.

Marsh/Meadow sites should be surveyed as a single site. GPS the perimeter of the site and record the coordinates in the comment field (these will be used to generate a GIS polygon for the site). Record as many points as needed to characterize the general shape of the marsh/meadow. Usually less than 10 points will suffice. Complete a VES, visual fish survey, shrimp survey, photo, and inlet/outlet surveys (if applicable). Littoral and shoreline habitat surveys do not apply.

Spring seep sites should have a VES, visual fish survey, shrimp survey, and photo. Littoral and shoreline habitat surveys do not apply.

**Seasonality:** The determination of whether a water body is perennial or ephemeral should be made based on field determination. Cues such as grass or terrestrial vegetation on the lake bottom; undecomposed duff; obvious bath tub ring; or low lake level can be used to assess status. 7.5' maps may help the surveyor make a call. Perennial lakes and ponds are shown in dark blue, ephemeral lakes and ponds are shown in white with blue diagonal lines, and marshes are indicated by a marsh symbol.

**Not Sampled:** If the water body indicated on the map is frozen, dry, not found, part of another water body, or is a stream widening, your sampling will be limited. Circle the appropriate reason why the water body was not fully sampled: stream widening, frozen, dry, not found, or part of another water body.

Frozen water bodies can usually be handled in one of two ways. Completely frozen sites offer little to no opportunity to survey for animals, thus indicate the site is frozen in the appropriate check box and comment fields and move on. Partially frozen sites may offer some opportunity to VES for amphibians, furthermore, this is often the time when high mountain species begin breeding. Indicate in the comments that the site is partially frozen, take an overview photo, and conduct a VES.

Dry sites can often have newly metamorphosed bufo species and hyla regilla. VES the site, including any tributaries, and take an overview photo.

Sites that are not found should have only the top box of the data sheet filled out, indicating that the site was not found in the “Location” box. Palm – fill out a survey main and indicate in the comment field that the site was not found.

Stream widenings are those water bodies shown as perennial ponds but that have more than 10% of their surface area with noticeable current, i.e., these are more like stream pools than ponds.

If the water body of interest is actually part of another water body, sample and complete a data sheet for the larger water body, and fill out only the top box of the data sheet for the smaller water body, indicating that it is actually part of the larger water body in the “Location” box. In other words, the site that is considered part of another

waterbody, will receive a full survey under the Lake ID of the larger site. Palm – fill out a survey main for the site but indicate in the comments that the full data set is associated with a different site and list the site ID.

**Planning Watershed:** The watershed name for all lakes is given on the "Lakes Checklist." Do not use the name of the outlet creek given on the 7.5' map as the drainage name, as this may not be a complete description.

Palm - The watershed name should be auto-populated for all pre-identified site IDs (i.e. those ending in .00). If a new site is being surveyed, use your survey map to identify which planning watershed the new site is located in, and pick the appropriate watershed name from the picklist.

**County:** Record the county (from 7.5' map) in which the lake feature lies.

**Elevation:** Record the elevation from the 7.5' map, or a calibrated altimeter (such as the altimeter feature in the Garmin eTrix Vista GPS). When using the map look for labeled contour lines to determine contour interval distance and units. Be aware that maps generated in the office by GIS software that span multiple 7.5' quads may display intervals in both meters and feet. The lake elevation is the average of the contour line below the lake and the contour line above the lake. Thus, if a lake is between the 9860' contour and the 9900' contour, the lake elevation should be recorded as 9880'. A common mistake is to assume that the proximity of a lake to a contour line indicates that the elevation of the lake is close to the value of that contour line. The horizontal distance between two points on a topographic map bears no relationship to the vertical distance between those same two points. Record the units used (m or ft).

If the lake has a water level elevation (i.e. WL 9832), use this number in the elevation field (note- water level elevations are a good source to calibrate an altimeter).

Avoid using the GPS estimated elevation because this number is highly inaccurate (+/- 200meters in many cases).

**UTM Coordinates:** This is a pair of numbers that are basically x and y coordinates. In our area, they are North and East. These numbers need only be obtained for lakes not shown on the 7.5' maps or for those lakes lacking a Site ID. Use a GPS unit to obtain the UTM coordinates. Also record the UTM zone that you are in. **Make sure your GPS is setup in UTM NAD83.** These coordinates are critical as they will be used to map the lake.

**Topographic map:** Record the name of the 7.5' topographic map (or "quad") that contains the lake feature. These are listed in the legend on our CDFG navigation maps. Palm- not used in Palm.

**Maximum lake depth:** Measure maximum lake depth with the Speedtech SM-5 Depthmate Portable Sounder. Do not spend inordinate amounts of time sounding every part of the lake to find exactly the deepest part. By sounding the deepest-looking piece of the lake, you will quickly get a feel for where the deepest spot actually is. Precise measurements of "maximum depth" are not very important in large deep lakes. However, in shallow lakes (< 5 m) a precise depth ( $\pm 0.5$  m) is very important. Plan to take maximum depths when setting or retrieving gill nets, but the data must still be collected even when nets are not set. **This data field was ignored too often in the past but is one of the more important data for determining future management options!** Enter this value on the Fish Data Form at the top of page 3, or at the bottom on page 2 if no gill net fish survey was completed for a site. In the Palms the Max Depth field is located in the Fish Header Subform.

Maximum lake depth should be measured even when field crews are not equipped with a depth sounder. There are many methods to improvise and collect depth measurement, but the simplest is often a known length of cord and a rock.

**Team Members:** Use complete names. Palm - All crew involved in data collection should be recorded in the Surveyors Subform. The VES crew should be listed in the amphibian surveyors subform.

## Lake Characteristics

The habitat characterization is perhaps the most subjective of the measurements made using this protocol., and we hope to reduce the potentially high observer bias by stressing the need for survey consistency. In other words, it is important to practice the protocol, calibrate visual estimates with real measurements, check each other's data, and maintain consistent survey methods.